Phonological and phonemic awareness : Their impact on learning to read prose and to spell

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Phonological and phonemic awareness, over the last two decades, have been identified as key influences on literacy acquisition. In this article I would like to review some of the research in which I have been involved and its implications for understanding and facilitating literacy learning.

At the outset it should be noted that while some investigators use the terms 'phonological' and 'phonemic' knowledge synonymously, the present paper distinguishes between them. Phonological knowledge is a knowledge of sound patterns. Phonemic knowledge is one aspect of this; a knowledge of individual speech sounds (Share , 1995; Stahl & Murray, 1994). Among other advantages, this distinction draws attention to the difference between a knowledge of individual and multi sound units and has implications for diagnosis and teaching.

To make sense of any text we read, we need to connect the written words with our spoken knowledge. Our phonological knowledge helps us do this by giving us with ways for linking letter clusters with what we know about how words are said. It helps us to detect sounds in spoken words. When we are learning to read words, these sounds provide the 'hooks' to which we can attach the letter clusters. We can have sounds for individual letters, (for example, d, r, o, p, e,) and for letter clusters such as onsets, (for example, dr), syllables (for example, 'sec' and 'ret'), morphemes (such as 'ed' or 'pre') and word stems (such as 'pare' in prepare and compare). A person's knowledge of sound patterns provides a foundation for learning the matching letter clusters.

To learn letter clusters, young learners need to recognise them in written words, break up the spoken forms of the words into smaller sounds and link the letter clusters and sounds. They also need to 'transfer' what they know about letter cluster- sound matches in one word to the same letter cluster in other words. This allows them to use what they know about some words to read others. Suppose readers can read 'train' automatically but can not yet read 'stain' or 'brain'. Those who can't detach the "ain" from the spoken form of "train" will be less able to use it to read the written words 'stain' or 'brain'. They may recognise the shared letter units but this will not help them to read the two new words using the known one.

These processes are part of a general cognitive ability believed to be mediated in the language area of the left hemisphere. This ability can also affect how people learn to pronounce words and to remember verbal information for a short period.

Those who have reading difficulty are less able to perform these processes. Some can, for example, segment a 3- sound word but not longer words into sounds. Their reading suggests that when they look at a word they see individual letters rather than groups of letters at a time; they detect letters but not clusters. They read words either by sounding out letter by letter or pick out one or two letters and use these unsystematically to decide what the word is. They cannot use what they know about some words to read others. They may know a great deal about the topic of the text but can't use this knowledge when they read because they can't read efficiently enough of the words.

Background to the current research

The research activities described in this paper derive from earlier investigations that have examined the link between aspects of phonological knowledge and literacy learning. This link is of a 'reciprocal causal' nature; learning aspects of phonological knowledge and literacy learning.

Evidence for the phonemic-literacy nexus has come from two main types of studies; correlative-predictive studies and phonemic training studies. Phonemic ability predicts later reading and spelling achievement, both for word recognition (for example, Munro, 1993; Munro & Munro, 1993; Wagner, Torgesen Rashotte, 1994; Stanovich, 1986) and for comprehension (Tunmer & Nesdale,

1985). Word reading ability is predicted by earlier rhyming and alliteration abilities (MacLean, Bradley & Bryant, 1987), sound segmentation, segmenting words both completely into sounds and stripping off the first sound (Share, Jorm, Matthews & Maclean, 1988; Tunmer & Nesdale, 1985) and by blending sounds into words (Perfetti, Beck, Bell, & Hughes, 1987). Not only does phonemic knowledge predict reading acquisition, but the reciprocal relationship also exists; learning to read contributes to sound awareness (Stanovich, 1986).

Teaching phonemic awareness improves early reading and spelling. Effective teaching activities include blending, segmenting spoken words into sounds either by counting the number of sounds, tapping out the sounds or by saying the sounds in words, categorising words according to shared rhyming or alliteration patterns, sound discrimination and phoneme identity (Ball & Blachman, 1988; Bradley & Bryant, 1985; Byrne & Fielding-Barnsley, 1993; Hurford, 1990; Lundberg et al., 1988; Share, 1995; Vellutino & Scanlon , 1987). Teaching letter-sound correspondences with phonemic awareness is more useful than either phonemic awareness or phonics teaching only (Ball & Blachman, 1988). The extent of the positive influence depends on the entry phonemic and reading knowledge of students and when the influence is measured, either immediately after the teaching or later (Share, 1995).

Phonological knowledge is acquired developmentally, spanning from the preschool years to the third-fourth grade levels (Lenchner, Gerber & Routh, 1990; Maclean, et al., 1988; Vandervelden & Siegel,1995; Yopp, 1992). It is first displayed when children learn and remember how words such as the names of objects and events are said. Most children do this relatively easily and with little practice. Those who find this hard may later have difficulty both saying words accurately and reading words, because the written words do not match their spoken forms. Many disabled readers juxtapose, omit or substitute sounds or syllables, for example, say "torrelant" for 'tolerant'.

From this they learn to recognise sound patterns in words and to manipulate gradually sounds in words; to segment words into onset and rime, to isolate a sound within a word, to segment 1-syllable words into sounds and to blend a string of sounds into a word. They link sounds and letters, that is, learn phonological recoding. This equips them with three types of early word reading strategies; selecting and memorising distinctive visual features of words, recoding systematically each letter to a sound and then blending the sounds and using part of the letter-sound information, for example, recoding the first few letters of a word and synthesising this with contextual information. Of these strategies, using distinctive visual features is least effective in the long term (Frith, 1985; Freebody & Byrne, 1988). They may use a combination of them.

Later they manipulate sound patterns in more complex ways. They learn to match sounds in two or more words , delete sounds from a word, substitute sounds and categorize sounds, for example, the vowels into long versus short categories. The clusters learnt first are those for which children already have the sound patterns, for example, onset and rime units (Treiman, 1985).

Orthographic knowledge is learnt gradually. A child may recognise some words and letter strings automatically and accurately (consistent with orthographic processing) and at the same time use word segmentation and recoding to read others. They develop a 'self-teaching mechanism' to learn orthographic information independently (Jorm & Share, 1983; Share, 1995). This mechanism is based on phonological recoding and uses phonemic awareness. They learn to make analogies between known and unfamiliar words by noting letter group similarities and using the sounds that match the letter cluster in one word to read the others. A level of phonemic decoding is necessary for making these analogies (Ehri & Robbins, 1992; Goswami, 1991).

Questions the research has examined

We have been interested in 'bridging the gap' between research in phonological knowledge and what it means for teaching. This paper examines four of these aspects.

1.   How much sound information can students handle during learning ? As we noted above, phonological knowledge is acquired in a developmental order. One aspect that might affect how well students learn this knowledge is the amount of sound information they can handle at any time. We examined how the sound length of words affected children's ability to identify the

sounds.   We predicted that they would be able so perform phonemic skills such as segmenting words that had fewer sounds before being able to segment longer words.

2. ***How does phonological awareness knowledge influence prose reading ?***
Surprisingly, this question has received little attention. Teachers often assume that while phonological knowledge might affect reading isolated words aloud, it is less likely to influence reading prose aloud because of the contextual support. This expectation ignores the importance of phonological coding in initial word reading and the importance of recoding during comprehension. We predicted that for younger children learning to read, phonological awareness would influence word reading accuracy, comprehension and rate and that this effect would decrease with further reading development.

3. ***How does phonemic knowledge influence spelling ability ?*** Children learn to spell unfamiliar words in two main ways; by internalising the orthographic patterns of written words by imitation and by synthesising their knowledge of letters and letter clusters with how the word is said in an analogy process.   The extent to which these ways are influenced by the ability to segment the word into sounds has not been resolved (Goswami & Mead, 1992; Moustafa, 1995). Our research examined the link between an awareness of the sound segments in words and learning to spell, both through imitation and by analogy.

4. ***The phonemic awareness knowledge of literacy-disabled gifted students***   How is phonemic knowledge linked with other aspects of verbal and nonverbal reasoning ? Anecdotal observations made during the diagnosis and teaching of children with literacy difficulties suggested that a number also displayed superior verbal and /or nonverbal reasoning ability.   Such an observation may be unexpected; given that reading is supported by verbal linguistic processes, one might expect that students with access to richer verbal conceptual knowledge would be less likely to display reading difficulties. Other researchers supported the existence of such a group of students but had not described the nature of the difficulty (for reviews see Clark, 1992; Emerick, 1992; Silverman, 1989).   Hishinuma (1993) note that these students are frequently seen as "dumb or lazy" and "score dangerously low in self-concept inventories" (page 30), and are mis-diagnosed as having behavioural disorders.   The present research examined the extent to which the difficulty was attributable to phonemic difficulties.

The research tasks.

Our investigative work used the following set of phonological tasks:

Task 1 : Implicit awareness of sound patterns in words; recognising and producing rhyming words both for individual words and in prose and recognising words that alliterate.

Task 2 : Segmenting words into smaller parts; segmenting words into onset and rime, syllables and individual sounds, identifying the first and last sounds in words.

Task 3 : Sound blending, both for onset and rimes and for a sequence of sounds.

Task 4 : Manipulating sounds within words;.deleting sounds from a word, substituting one sound for another and segmenting 2- 3- or 4- syllable words into syllables and into sounds

Task 5 : Phonemic recoding : Bridging to written words; reading individual letters, letter clusters and groups of letter clusters.

The set of tasks is described in an assessment and teaching package (Munro, 1998).

The research outcomes

 The present paper summarises outcomes in the four areas mentioned earlier.

1.   Developmental trends in processing phonemic information.

The amount of phonemic information readers can process automatically. The developmental trend in phonemic task difficulty has already been noted. A second aspect of a possible developmental trend is the amount of information developing readers can handle at any time. If children are manipulating sound information in an attention-demanding rather than automatic way, it is possible that they can perform tasks such as phonemic segmentation for words with few sounds before they can perform them with longer words.

To investigate this prediction we examined whether performance on phonological tasks 2 to 4 above was influenced by the number of sounds in words, for children from grade levels prep to four. Our results showed that sound length of the word was a major influence, particularly for the younger students (p < .01). We proposed the notion of 'phonemic segmentation span' or PSS to describe this. The PSS for any child is a measure of the longest spoken words the child can segment accurately into separate sounds. It has obvious implications for teaching and assessment. Our current research is examining how a child's span influences the types of words they can learn to read automatically. Children whose span is lower can handle fewer sounds at once automatically and may be expected then to learn to read orthographically shorter, less complex words. This work is described in Munro (1996) and in part in Slaviero (1996).

The invariance of the developmental sequence of tasks across ages. A second aspect of the developmental sequence is whether it remains invariant across all ages. While several studies have shown that task 2 is easier than task 4 for children in the course of acquiring phonemic knowledge, the extent to which this order of difficulty continues for older children who have reading difficulties has attracted less attention.

Our investigation indicated that adolescent students with specific reading difficulties found the sound deletion and substitution tasks (4.1 and 4.2) easier than the phonemic segmentation tasks (2.5); while these readers continue to have difficulty segmenting words into sounds, they develop procedures for manipulating the sounds in words that may not necessarily involve manipulating individual phonemes.

2.   The influence of phonemic awareness on the quality of prose reading

Surprisingly, the issue of how phonological awareness influences the quality of prose reading has received little attention. One might expect that the extent to which readers can match unfamiliar written words with known spoken words during prose reading may depend on how well they can segment the spoken forms into smaller units. An earlier study by Stuart-Hamilton (1986) showed that infants who were more 'phonemically aware' were more able to read words in prose accurately and made fewer 'nonsense errors' in prose reading.

Our research examined the link between prose reading aloud and children's level of phonological awareness. It showed that children's level of phonological awareness is correlated with several aspects of reading aloud; their ability to read words accurately, to comprehend what they read and to read fluently. The effect is strongest for the younger children. At the first grade level, alliteration, onset -rime segmentation, phonemic segmentation, phonemic deletion, letter-sound recoding and phonemic blending each correlated with both word reading accuracy and comprehension at a level exceeding .5 (that is, p< .01) and phonemic segmentation and deletion correlated with rate of prose reading at a level exceeding >.5 . The number of phonological measures correlating with the three measures of prose reading alouf pattern decreased through grade 2 until at the third grade level only phonemic deletion correlated with both prose comprehension and word reading accuracy at a level exceeding .5, while no measure achieved this level of correlation with reading rate.

These data suggest that phonological awareness has a developmentally limited influence on reading aloud performance. If phonemic awareness difficulties are not resolved at an early age, prose reading difficulty is likely to continue.

3.   The influence of phonemic awareness knowledge on spelling ability.

Learn to spell unfamiliar words, either by imitation or analogy with known words, is influenced by a knowledge of letter-sound mappings, the amount and complexity of orthographic information they can process and their knowledge of word structures. When asked to spell a previously unseen word from its sound form, they need to segment the word into phonological units and map these into

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orthographic units.   They use similarities in sound properties to make analogies between the new and known words and use the spelling pattern of the known word to generate the unfamiliar word (Goswami & Mead, 1992; Moustafa, 1995). .

Children's existing knowledge of spelling patterns has been shown to develop gradually, in a sequence influenced in part by their ability to process letter-sound information in words (Ehri, 1989; Gentry, 1981; Griffith, 1991; Richgels, 1995; Blachman & Tangel, 1994; Treiman; 1993). At the earliest stage,   the pre communicative stage (Gentry , 1982), children show an awareness that writing consists of written symbols that may or may not be like letters or numerals.   At the second stage, the semi phonetic stage (Ehri , 1989; Gentry, 1982) they show a global awareness of the phonological structures of words, representing some of the sounds in them either by letters or letter-names. The third stage, the phonetic stage, shows an awareness that all sounds in words can be represented phonetically by letters.   At the fourth stage, the transitional stage (Gentry , 1982; Temple, Nathan, & Burris, 1982) spellers no longer rely on sounds alone to spell and begin to use devices such as silent marker to spell long vowels although the markers may sometimes be misplaced.   This leads to fifth stage, at which the conventional orthographic representations of sounds in words are assimilated with irregular spelling patterns.

One might expect therefore that learning to spell both by imitation and by analogy requires a level of phonemic awareness. Successful use of analogy would seem to require the ability to recognise, segment and delete and substitute phoneme when making comparisons between words.   Earlier research, in part, supports this. Griffith (1991) has show that phonemic awareness has a developmentally limited influence on spelling; while first grade children rely more on phonemic awareness skill to spell, third grade children rely more on memorised orthographic units to spell words that contained phonemes with more than one rule-governed spelling. The issue of whether the analogy process requires a level of phonemic awareness is currently debated (Goswami & Mead, 1992; Moustafa, 1995).

Our research has examined the extent to which an awareness of the sound segments in words influences learning to spell, both through imitation and by analogy.   Its focus has been on the processes that might hasten movement toward accurate conventional spelling.   An unresolved issue concerns the mechanism underlying this change.

It did this by investigating how the phonemic knowledge of pre-readers influenced their ability both to learn to spell unfamiliar words and to use this newly acquired knowledge to spell other words.   A group of 32 pre-reading prep and first grade children were asked to spell a set of eight one syllable words, that comprised three rime pairs (*beak, leak, late, fate, fight, tight*) two words that shared letters but not rimes with these pairs *(beat, lame, pill)*.   Each word was assessed on a scale of from 0 to 6, depending on the level of invented spelling it implied, using the scoring procedure developed by Tangel and Blachman (1995).   They learnt to spell, by imitation, three to the words, *beak, late* and *fight*   over eight successive trials and again were tested on their spelling of the eight words, using the same procedure as for the pre-test.   As well, their phonemic awareness was assessed using the four tasks mentioned earlier.

The results showed that children's initial level of spelling, the number of trials they took to learn the correct spelling for each word and their ability to spell by analogy were all influenced by students' level of phonemic awareness. Prereaders who had the lowest levels of phonemic awareness made the smallest gains in spelling knowledge through the invented spelling developmental sequence. Comparison of spelling performance of beak with leak, late with fate and fight with tight showed that rime analogies were easier to use than non-rime analogies.

4.   The phonemic awareness knowledge of literacy-disabled gifted students Given that reading draws largely on verbal linguistic processes, one would expect that those students with richer verbal conceptual knowledge and access to higher levels of verbal reasoning would be less likely to display reading comprehension difficulties. They may also be expected to show fewer word reading problems because their richer verbal networks should facilitate accurate word identification.

Earlier studies examining both the characteristics of these children and effective teaching interventions have been inconclusive. Interventions, for example, with few exceptions, have been at best partially successful (Dowdall & Colangelo, 1982; Emerick, 1992)).   This was attributed to a lack

of understanding of cognitive and affective influences on their learning (Lowenstein , 1977). Of the studies reviewed, few investigated the specific cognitive deficits that may account for the literacy difficulties. In a compilation of the findings of 26 studies Clark (1992) identified twenty four characteristics, of which none is associated with reading or learning to read and only four relate to broad cognitive factors; the gifted underachievers were seen as less versatile or adaptive intellectually, were less planful and less likely to frame up academic goals for themselves, had poorer study habits and were less motivated academically. The rest were associated with interpersonal, affective and self-esteem characteristics. In reviewing the causes of under achievement Clark refers to sources within the student's personality, the school and the student's family. Again, issues associated with learning were not directly addressed.

The comparative ineffectiveness of the learning assessment and educational support programmes for these students can be attributed to several possible sources that are themselves related. Developing and implementing educational intervention programmes for students requires an understanding of students' learning characteristics and needs. As noted above, the current lack of understanding of the cognitive and affective characteristics of these students in relation to academic learning is likely to impact these provisions. It is interesting, for example, that few of the studies reviewed in developing this investigation made reference to recognised causative factors of reading disabilities in the more general area of learning disabilities.

A study by Munro (1995) describes a sample of eleven gifted students aged from 8 to 15 years, who displayed chronic literacy disabilities. Several reading-related abilities were measured; reading words in connected prose and in isolation, phonemic awareness and orthographic knowledge. The reading disabilities were attributed to an immature orthographic knowledge of words that meant that the students needed to invest a comparatively large amount of attention in deciding the words in the text read. As a consequence, they had comparatively little attention for tapping into their well-developed general knowledge and using this to facilitate either word recognition or reading comprehension.

As well, they displayed immature phonemic awareness knowledge, scoring at a lower level on each measure of phonemic awareness than grade two average readers ($\underline{p} < .01$) . As a consequence, they used either attention-demanding non-orthographic recoding strategies to read most words or distinctive visual features. They also had difficulty using their orthographic knowledge of some words to recognise others through analogy processes.

These results in summary

These findings indicate the pervasive influence of the development of phonological knowledge on early literacy learning. First, its influence is not restricted to learning to read isolated words. It affects the quality of prose reading in a range of ways; in the ability to read words accurately, to comprehend what was read and reading fluency. This influence decreases with increase in age.

Second, it influences spelling ability in several ways, both in learning to spell unfamiliar words by copying letter patterns and by making analogies or links with known spelling patterns.

Third, it was shown that gifted students who had literacy learning disabilities displayed them in the phonological processing area. In other words, phonological processing may be independent of verbal-conceptual processing, at least for younger students.

Implications of this research for instruction

The research described in this paper has implications for how teachers understand the acquisition of literacy knowledge, diagnostic practice and the implementation of effective teaching procedures.

What do teachers understand about the phonemic structure of words ? Teacher knowledge of literacy development is important if students are to receive the most effective teaching. One aspect of this is an understanding of phonological and phonemic awareness and the role they play in this development.

A foundation for teacher knowledge in this area is teachers' understanding of the sound structure of words. One way of examining this is to ask teachers to perform the phonemic awareness tasks, for

example, to judge the number of sounds they believe make up words that they hear. Judgments of the number of sounds in 1-syllable words were recorded for 80 primary and secondary school teachers enrolled in post-graduate studies in literacy education in Victoria. The mean number of years of teaching was 16.8 years (2 years - 23 years experience). All had spent at least one year teaching literacy-oriented knowledge. The words the teachers heard (each was spoken twice) and the distribution of judgments are shown in Table 1.

Table 1 : Teachers judgements of the number of sounds in spoken word.

word heard	judgment of teachers					
	2 sounds	3 sounds	4 sounds	5 sounds	6 sounds	
blade	30	20	30			
strike	17	25	28	11		
paddle	22	36	22			
night	31	49				
swim	30	20	30			
fighting	18	24	20	18		
spent	20	23	12	25		
crossed	5	34	13	28		
scratch	6	24	11	33	6	
plinth	3	34	12	31		

The range of judgments displayed by the teachers indicate the lack of clarity in the judgment of the sound structure of words. Difficulty making these judgements is not restricted to children. Obviously, if teachers are to implement effective teaching procedures, they need to have a clear understanding of the sound structure of words.

One reason for the range in judgments was variation in the criterion for that was identified as ' a sound'. Some used the criterion of the smallest possible sound unit that could be detected, while others used the criterion of a sound being a unit shared by two or more spoken words. The sound spoken unit that matched 'sp' cound be sound according to the second but not the first criterion. This apparent confusion was less likely in the administration of the tasks with students because practise tasks are usually used prior to experimental task administration.

Professional development programs that assume that this knowledge is in place are less likely to be effective if they neglect to clarify and negotiate this understanding at the outset. The effectiveness with which teachers diagnose and remediate literacy difficulties will be influenced by this knowledge.

Developing a word reading instructional program based on phonemic awareness trends. A second implication relates to the development of teaching procedures for enhancing literacy knowledge by including an explicit phonemic awareness programme.

A phonemic awareness base for teaching word reading involves students learning first the phonological properties of a type of word, then its phonemic properties, letter cluster-sound mappings and finally its orthographic properties. For 1-syllable words, this involves learning first the onset-rime properties of the word type followed by their separate sounds. This developmental sequence prompts the question : Does teaching students to read words by teaching onset-rime units such as 'ain' or 'ail' prior to the more abstract phonic units such as 'ai' facilitate learning ?

The limited research available supports this sequence (Adams, 1990; Ringler & Weber, 1984). One reason for this is rime units that contain vowels and at least one consonant are more reliable in how they are said than individual vowels and vowel digraphs. Approximately 95 % of the vowels in rimes in primary level text are said in the same way in all of the words that appear in the texts. Readers find it easier to learn to read words by using 'rhyming phonograms' (Adams, 1990, page 321) than by being taught spelling-sound correspondences and phonic generalisations. Wylie & Durrell (1970) observed that phonograms containing long vowels were learnt as easily as phonograms containing short vowels, that phonograms with the long vowel-e form (for example, crane) were not harder than vowel digraphs (for example, train), the vowel+r (for example, 'arm') and vowel+w (for

example, 'awn') were not more difficult than those with long and short vowels and those with a final consonant were easier than those with a consonant blend.

On this basis, the author has developed an approach to teaching students to read words (Munro, 1996) by focusing on their consistent rime or letter cluster -meaning patterns. The sequence for teaching any letter cluster in 1-syllable words involves students learning the phonological properties of a set of words, their phonemic properties, the letter-sound links and the orthographic properties.

An example of the teaching sequence is as follows. Students are shown a set of up to five examples of a rime (for example, *link, mink* and *sink*) and

- work on the phonological structure of the words, for example
  - accurately say the words
  - segment spoken words such as into onset and rime
  - suggest other words that rime or alliterate with the pattern
  - discuss the shared sound pattern and
  - make up nursery rhymes based on the pattern
- work on the phonemic structure of the words, for example, segment them into sounds.
- read each word both with the teacher and by themselves, reading the rime unit first.
- discuss how the words are similar, both in shared letter clusters and shared sounds.
- visualise each word
- transfer the letter-sound rime units to other words.
- read the letter cluster in prose in a range of activities.
- discriminate the word type from similar rimes.
- spell the words.
- read 2- and 3- syllable words that have the letter cluster
- say what they know now about the letter cluster pattern; they describe how it is different from other patterns they know, how they will remember it, how they can recognise it in unfamiliar words, how they can use what they know about some words to read others, how they go about segmenting words.
- use the letter cluster in dictation for sentences
- automatize their letter cluster knowledge in a range of activities.

Key aspects of the programme include

- ensuring that the teaching begins with what students already know, including their prerequisite phonological knowledge.

- automatizing the letter-cluster patterns.

- using the letter cluster in prose.

- encouraging students to reflect on and question the letter clusters they are learning.

- having students say what they have learnt; what they know about the letter cluster, describe how it is different from other patterns they know and what they can do to remember it.

- developing '**meta-orthographic'** knowledge ; readers talk about their developing knowledge of letter patterns, say how they will use them in the future, how they can use what they know about some words to read others, how they can make bigger words from the smaller words and how they segment words.

- encouraging students to see themselves as 'self teachers', using their knowledge of letter clusters in some words to read unfamiliar words and transport their letter cluster knowledge.

- having students link the new knowledge to what they already know.

- checking readers can remember the letter cluster on later occasions.

A similar procedure has been developed for assisting readers to learn how to read 2- and 3- syllable words. The focus is on understanding the concept of the syllable, learning to use syllabic boundaries, understanding stress patterns in these words and the concept of stressed and unstressed syllables. This is developed by building words from syllables in phonological activities.

The approach described here fits well with the highly successful programme developed by Hudson (1996). The use of orthographic units written on cards (the 'educards') works very well with children who find word reading difficult.

The future for phonological processing ?

The summary of research outcomes described in this article indicate that the nexus between phonological and orthographic processing is far from resolved, with investigators currently questioning whether orthographic and phonological coding can be dis-entangled in learning to read (see Badian, 1994; Olson, Forsberg, Wise & Rack, 1994; Vellutino, 1995; Vellutino, Scanlon, & Tanzman, 1994; Willows & Geva, 1995) and the need to integrate the different approaches to word reading (Andrews & Scarratt, 1996).

Some teachers have categorised phonological knowledge as yet 'another currently politically correct fad' and have decided to wait for it to fade (or 'fad' ?) away. Given its demonstrated importance in the literacy learning process and the support for its inclusion in literacy education programmes, this will be unlikely. Professionals working in the areas of literacy education and learning difficulties would be well advised to familiarise themselves with the phenomenon and ensure that their teaching practice fosters it.

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